

CLAIMS:

1. A solid electrolytic capacitor comprising:

a foil-like valve metal substrate formed with an insulating oxide film on the surface thereof;

5 a valve metal body whose one end portion region is bonded to one of two opposite end portion regions of the foil-like valve metal substrate so that electric connection can be established between the valve metals; a conductive metal substrate whose one end portion region is bonded to the other end portion region of the foil-like valve metal substrate so that 10 electric connection can be established between the metals;

and a cathode electrode formed by sequentially laminating at least a solid high molecular polymer electrolyte layer and a conductive layer on the surface of the foil-like valve metal substrate;

15 a cathode lead electrode being drawn out from the cathode electrode in a direction perpendicular to one major surface of the foil-like valve metal substrate.

2. A solid electrolytic capacitor comprising:

20 at least two solid electrolytic capacitor components each comprising a foil-like valve metal substrate formed with an insulating oxide film on the surface thereof;

a valve metal body whose one end portion region is bonded to one of two opposite end portion regions of the foil-like valve metal substrate so that electric connection can be established between the valve metals;

25 a conductive metal substrate whose one end portion region is bonded to the other end portion region of the foil-like valve metal substrate so that electric connection can be established between the metals;

and a cathode electrode formed by sequentially laminating at least

a solid high molecular polymer electrolyte layer and a conductive layer on the surface of the foil-like valve metal substrate;

the at least two solid electrolytic capacitor components being partly overlapped so as to electrically connect the conductive layers thereof,

5 thereby forming a laminate of the solid electrolytic capacitor components;

a cathode lead electrode being drawn out from a surface of one of the cathode electrodes of the laminate of the solid electrolytic capacitor components in a direction perpendicular to one major surface of the foil-like valve metal substrate.

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3. A solid electrolytic capacitor in accordance with Claim 2 wherein two solid electrolytic capacitor components are disposed to face each other as rotated with respect to each other by 180 degrees.

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4. A solid electrolytic capacitor in accordance with Claim 2 wherein four solid electrolytic capacitor components are disposed to face each other as rotated with respect to each other by 90 degrees.

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5. A method for manufacturing a solid electrolytic capacitor comprising steps of:

bonding one end portion region of a valve metal body to one of two opposite end portion regions of a foil-like valve metal substrate formed with an insulating oxide film on the surface thereof so that electric connection can be established between the valve metals, thereby forming 25 an electrode body for a solid electrolytic capacitor component;

masking a part of the valve metal body located on one side of the electrode body;

dipping, of the whole electrode body, the whole foil-like valve metal substrate, the entire masked portion and a part of the valve metal body

which is not masked in a forming solution, applying voltage to the electrode body to effect anodic oxidization thereon and form an insulating oxide film at least at an edge portion of the foil-like valve metal substrate;

5 forming a solid high molecular polymer electrolyte layer on substantially the entire surface of the foil-like valve metal substrate subjected to the anodic oxidization;

coating the solid high molecular polymer electrolyte layer with a conductive paste and drying the conductive paste to form a conductive layer;

10 removing the mask of the valve metal body;

mounting at least one solid electrolytic capacitor component thus fabricated on a lead frame, bonding one end portion region of an anode lead portion formed in the lead frame in advance to the other end portion of the valve metal body, thereby forming an anode lead electrode, 15 connecting a cathode lead portion formed in the lead frame in advance to the conductive layer, thereby forming a cathode lead electrode so as to be drawn out from the conductive layer in a direction perpendicular to one major surface of the foil-like valve metal substrate;

and molding the solid electrolytic capacitor component fixed onto 20 the lead frame with resin.

6. A method for manufacturing a solid electrolytic capacitor comprising steps of:

25 bonding one end portion region of a valve metal body to one of two opposite end portion regions of a foil-like valve metal substrate formed with an insulating oxide film on the surface thereof so that electric connection can be established between the valve metals, thereby forming an electrode body for a solid electrolytic capacitor component;

dipping the electrode body in a forming solution so that the whole

foil-like valve metal substrate is dipped in the forming solution, applying voltage to the electrode body to effect anodic oxidization thereon and form an insulating oxide film at least at an edge portion of the foil-like valve metal substrate;

5 forming a solid high molecular polymer electrolyte layer on substantially the entire surface of the foil-like valve metal substrate subjected to the anodic oxidization;

coating the solid high molecular polymer electrolyte layer with a conductive paste and drying the conductive paste to form a conductive 10 layer;

removing the mask of the foil-like valve metal substrate;

repeating these steps to fabricate at least two solid electrolytic capacitor components;

partly overlapping the at least two solid electrolytic capacitor 15 components so as to electrically connect the conductive layers thereof, thereby fabricating a laminate of the at least two solid electrolytic capacitor components;

mounting the at least two solid electrolytic capacitor components on a lead frame, bonding one end portion region of an anode lead portion 20 formed in the lead frame in advance to the other end portion of the valve metal body, thereby forming an anode lead electrode, connecting a cathode lead portion formed in the lead frame in advance to the conductive layer, thereby forming a cathode lead electrode so as to be drawn out from the conductive layer in a direction perpendicular to one major surface of the 25 foil-like valve metal substrate;

and molding the laminate of the solid electrolytic capacitor components fixed onto the lead frame with resin.